HERE AND THERE (CONTINUED)

Steam Aero Engines?

THE idea of using steam engines for aircraft propulsion is, of course, as old as flying itself. In fact, a Manley steam engine was used in the Langley "Aerodrome," and a steam plant was used by Sir Hiram Maxim in his earliest tests in this country.

More than ten years ago the American National Advisory Committee for Aeronautics examined the problem very thoroughly, and came to the conclusion, as stated in Technical Note No. 239, that on a weight basis the steam power plant was excluded; that on a fuel-economy basis it was excluded; that on a basis of drag of cooling surfaces it was excluded; and that on a basis of the sum of these three it was quite hopeless.

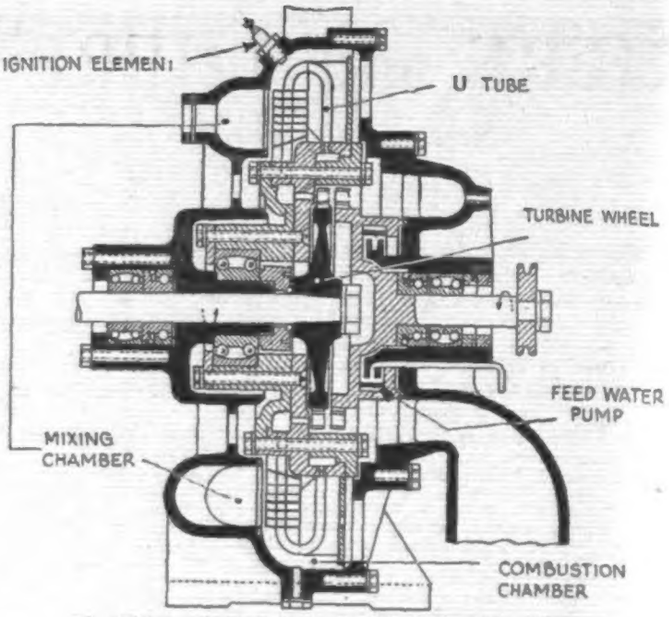
That progress has been made since then will be granted, when the claim is made that a 2,000 b.h.p. steam plant can now be built for aircraft, with a specific weight of approximately 2 lb./h.p. and a fuel consumption of 0.35 lb./b.h.p./hr. Yet those are the claims advanced by the designers of a prime mover for the exploitation of which a company is stated to be about to be formed.

Recently *Flight* had an opportunity to see a demonstration of one-half of this power plant, in the form of a rotary boiler. The other half is preferably a steam turbine incorporated within the same casing, although for relatively low powers, in which the turbine is known to be rather inefficient a reciprocating steam engine could be used.

The general principle is simple enough: It includes a boiler of the rotary type, with U-tubes having their open ends connected with the water pump and steam passage to the turbine respectively. The turbine is within the same casing, and when the turbine has once been started rotating by a small extraneous motor, electric or other, and has generated a certain amount of steam, it is self-driven on account of the reaction of the steam jets impinging upon the vanes of the turbine. The two rotate in opposite directions. A small rotary pump feeds the water to the boiler, but very little power is absorbed by the pump, as the quantity of water carried is very small indeed.

Fuel oil of almost any sort can be used, and a combustible mixture is passed through a series of holes in an annular mixing chamber into the combustion chamber, in which it is ignited by an electrically heated wire.

At the demonstration cold water was fed to the boiler and in about 65 seconds the steam gauge indicated 25 lb./sq. in. The fuel was turned off and cold water was fed to the boiler with no disastrous results. Then the fuel was turned on and the boiler started again. The particular boiler, it might be mentioned, was capable of an output of approximately 30 h.p.

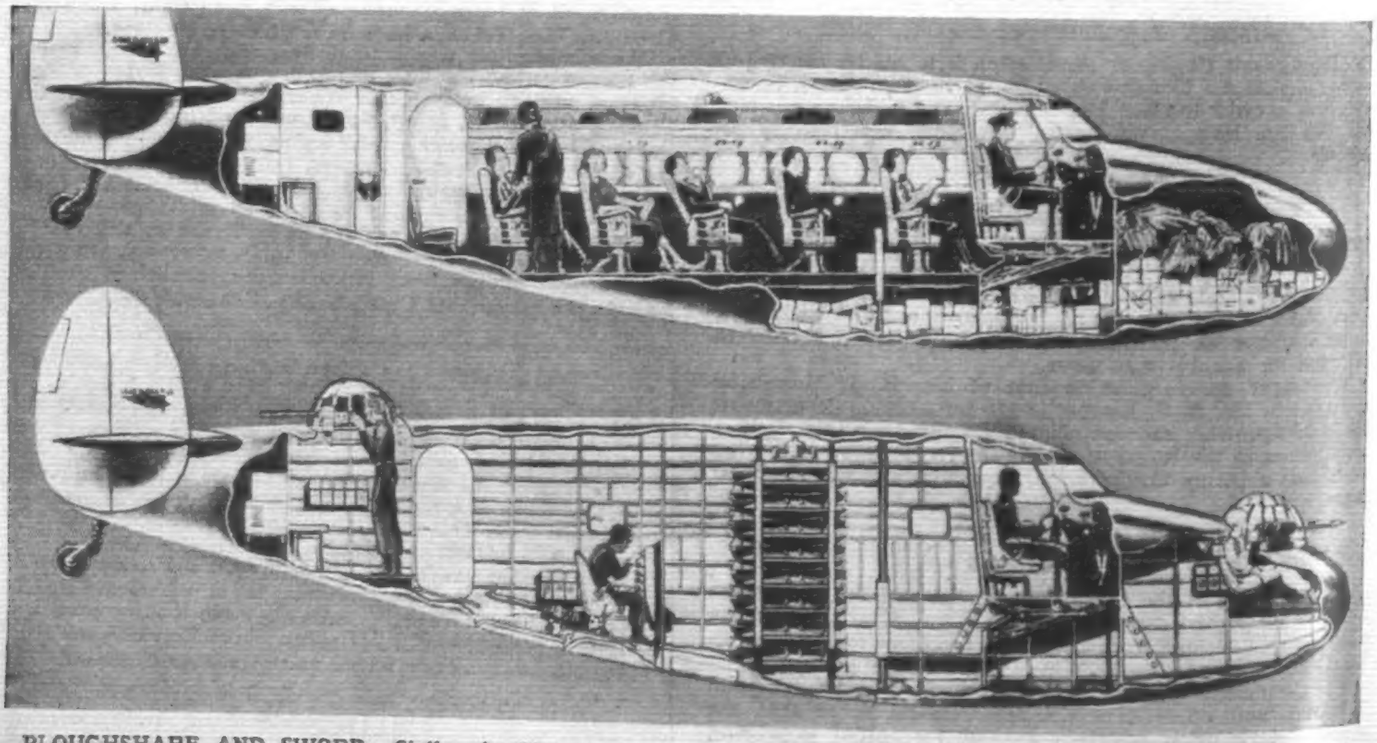


A section through the steam unit described here.

With all steam plants built so far, the condenser has been the great problem. It is claimed for this new plant that the rotary boiler can be used as a condenser. During the development period a boiler was, it is claimed, run at various speeds up to a peripheral speed of 830ft./sec. and providing pressures up to a maximum of 150 atmospheres. The maximum heat transmission capacity at maximum velocity was 553,000 B.Th.U./sq. ft./hr. When the same unit was run as a condenser, at the same maximum speed, the maximum heat transmission was found to be 203,000 B.Th.U./sq. ft./hr.

Accepting the figures given, there is still the difficulty of airscrew gearing. We are informed that in a 2,000 h.p. unit the turbine would probably be run at about 10,000 r.p.m. and the boiler at something like half that speed. One may imagine a twin-screw arrangement in which one airscrew is driven by the boiler and the other by the turbine, but the reduction gears are likely to present fairly serious problems.

For certain political reasons, the designers of the new steam plant desire to remain anonymous, but anyone interested can obtain further information from Aero Turbines, Ltd., 61, Crutched Friars, London, E.C.3. This address may be familiar to our readers as that also of Mr. J. McEwan King, of Deekay Aircraft Corporation, Ltd.



PLOUGHSHARE AND SWORD: Civil and military versions of the Lockheed 14 monoplane, sometimes called the Zephyr. The transport machine does over 260 m.p.h. with two Cyclone Gs; turrets will detract from the performance. The bomb stowage is interesting, an advantage being that only a comparatively small hole has to be cut in the skin covering of the fuselage for the bombs to make their exit.